

Division 3. Air Resources Board

Chapter 9. Off-Road Vehicles and Engines Pollution Control Devices

Article 4.7. Spark-Ignition Marine Engines

§ 2446. 2001 and Subsequent Model Year Production-Line Test Procedures and Selective Enforcement Auditing Regulations for Spark-Ignition Marine Engines.

(a) Applicability. This section applies to 2001 and subsequent spark-ignition marine engines. The allowable methods of production-line testing are specified in paragraphs (b) and (c), unless the engine manufacturer can satisfactorily provide an alternate method that shows an equivalent assurance of compliance to that of paragraph (b). The engine manufacturer must choose only one method for each model year and submit its method of production-line testing to the Executive Officer for approval no later than 90 days prior to the start of the subject model year production.

(b) 2001 and Subsequent Model Year Quality-Audit Production Line Test Procedures

(1) Engine Sample Selection

(A) Except as provided in subsection (b)(2), the engine manufacturer must randomly select one percent of the California sales volume of engines from each engine family for quality-audit testing.

(B) The Executive Officer may, upon notice to the engine manufacturer, require the sample rate to be increased to a maximum of ten percent of production (not to exceed 30 additional engines or units of equipment) of the calendar quarterly production of any engine family.

(2) Alternate Quality-Audit Engine Selection Criteria For 2001 and Subsequent Model Years

(A) An engine manufacturer may use the alternate engine selection method outlined in this Subsection.

(B) Engines or equipment must be randomly selected at a rate of 1.0 percent of engine family production at the beginning of production. When test results of the first 10 engines or units of equipment have been accumulated, an evaluation as indicated below must be made.

(C) Calculate the family mean and standard deviation of HC+NO_x. Identify engines or units of equipment that have emission levels greater than three standard deviations above the mean. Eliminate these emission data points and recalculate the mean and standard deviation. Continue the calculation until there are no values greater than three standard deviations above the mean. Count the number of these data points greater than the emission standard (outlier). If the total number of outlier is equal to or less than the allowable number in Table 1 for HC+NO_x, the engine family is eligible to continue to a second evaluation, shown in paragraph (D) below. Otherwise, sampling must continue at a rate of 1.0 percent of production for the rest of the month.

(D) If the allowable outlier criterion is met, the family mean standard deviation, and sample size determined for HC + Nox before excluding any outlier, are substituted in the following expression:

$$\frac{(\text{emission standard} - \text{mean})}{(\text{standard deviation})} (N)0.5$$

(E) If the expression is greater than C in Table 2 below, and the engine manufacturer reasonably estimates that the quarterly engine family production will exceed 5,000 engines or units of equipment, the sampling rate for the remaining portion of the calendar month following the date of selection of the last of the 10 engines or equipment is 10 per month, applied on a prorated basis. If the expression is greater than C in Table 2 below, and the engine manufacturer reasonably estimates that the quarterly engine family production will be 5,000 engines or units of equipment or less, the sampling rate for the remaining portion of the calendar month following the date of selection of the last of the 10 engines or equipment is 5 per month, applied on a prorated basis. If the expression is equal to or less than C in Table 2, the sampling rate continues to be 1.0 percent of production for the remaining portion of the month in which selection of the 10 engines or equipment is completed. The value of C is a function of the coefficient of variation (standard deviation/mean). The coefficient of variation and "C" must be rounded to the number of decimal places shown in Table 2.

Table 1

<i>Sample Size</i>	<i>Allowable Outlier</i>	<i>Sample Size</i>	<i>Allowable Outlier</i>
1- 32	1	430-478	11
33- 68	2	479-528	12
69-107	3	529-578	13
108-149	4	579-629	14
150-193	5	630-680	15
194-238	6	681-731	16
239-285	7	732-783	17
286-332	8	784-835	18

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333-380	9	836-887	19
381-429	10	888-939	20

Table 2

<i>Coefficient of Variation</i>	<i>C</i>
0.1	0.5
0.2	1.2
0.3	1.8
0.4	2.5
0.5	3.1
0.6	3.8
0.7	4.4
0.8	5.1
0.9	5.7

(F) At the conclusion of each month of quarterly engine family production, the emission test data must be evaluated in order to determine the sampling rate as set forth in Paragraphs C and D above. This evaluation must utilize all test data accumulated in the applicable quarter. The sample rate for the next month of production must be determined as follows: ten (10) engines per month when the engine manufacturer's estimated quantity of quarterly engine family production is greater than 5,000; five (5) engines per month when the engine manufacturer's estimated quantity of quarterly engine family production is equal to or less than 5,000; or, one (1) percent of the quarterly engine family production as determined by the sampling evaluation method set forth in Paragraphs D and E.

(G) For each subsequent quarter, the preceding sample selection method must be followed. The sample rate determination for the first month of each subsequent quarter must be based on the accumulated data from the previous quarter. The sample rate for the succeeding months of the quarter must be determined as previously set forth.

(H) If the start of production does not coincide with the first of a quarter, the sequence for sample rate determination must be followed, but references to remaining calendar months may not be appropriate.

(I) Where an engine manufacturer has sampled engines or equipment at a rate of 5 per month following a reasonable estimate that the quarterly engine family production will be 5,000 engines or units of equipment or less, and subsequently determines, or reasonably should determine based on information available to the engine manufacturer, that the quarterly engine family production will exceed 5,000 engines or units of equipment, the engine manufacturer must increase the sampling rate for the quarter such that the requirements of Paragraph D applicable to families reasonably estimated to exceed a quarterly production of 5,000 engines or units of equipment are satisfied.

(3) Compliance Evaluation

(A) Each engine manufacturer must review the test results of the first 10 test engines or equipment of each engine family, from each calendar quarter of production or from the start of calendar year production. It must also review the quarter's cumulative test results of each engine family at the end of each month. If 10 or more engines or units of equipment have been tested, the engine manufacturer must notify the Chief of the Mobile Source Operations Division and the Manager of the New Vehicle Audit Section, P.O. Box 8001, 9528 Telstar Avenue, El Monte, CA, 91734-8001, in writing within ten working days whenever an engine family exceeds an emission standard.

(B) At the end of the quarter, all of the data accumulated during the quarter are evaluated, and the compliance of the engine family with the family emission levels or emission standards, whichever is applicable, is determined. If a sample size for a particular production quarter is less than ten engines, the data from that quarter must be combined with all of the data from each successive quarter of the calendar year until data from at least ten engines that have been quality-audit tested are included in the quarterly evaluation. If the sample size for the first quarter's production for a calendar year does not contain at least ten engines, the data available for that quarter are evaluated. However, compliance of the engine family with the family emission levels or emission standards, whichever is applicable, is not determined until subsequent quarterly production data is available that includes evaluations of at least ten engines. If the sample size for the last final quarter's production for a calendar year does not contain at least ten engines, the data from the last final quarter must be combined with all the data from each preceding quarter of the calendar year until the sample size contains at least ten engines.

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(C) When the average value of any pollutant that is rounded off to the same number of significant digits as is the standard, in accordance with ASTM E 29-93a, exceeds the applicable family emission level or emission standard, whichever is applicable; or, when the engine manufacturer's submitted data reveal that the production line tests were performed improperly, the engine family may be determined to be in noncompliance. The Executive Officer will follow the manufacturer notification procedures in section (d)(4).

(D) A failed engine is one whose emission test results for a regulated pollutant exceeds the emission standard or FEL, as applicable.

(4) Reports

(A) Each engine manufacturer shall submit a written report to the ARB within 45 calendar days of the end of each calendar quarter.

(B) The quarterly report shall include the following:

- (i) The total production and sample size for each engine family.
- (ii) engine identification numbers and explanation of the identification code.
- (iii) The applicable emissions standards or Family Emission Levels for each engine family.
- (iv) A description of each test engine or equipment (i.e., date of test, engine family, engine size, engine or equipment identification number, fuel system, dynamometer power absorber setting in horsepower or kilowatts, engine code or calibration number, and test location).

(v) The exhaust emission data for HC+NO_x for each test engine or equipment. The data reported shall provide two significant figures beyond the number of significant figures in the applicable emission standard.

(vi) The retest emissions data, as described in Paragraph (v) above for any engine or unit of equipment failing the initial test, and description of the corrective measures taken, including specific components replaced or adjusted.

(vii) A statistical analysis of the quality-audit test results for each engine family stating:

- 1. Number of engines or units of equipment tested.
 - 2. Average emissions and standard deviations of the sample for HC+NO_x.
- (viii) Every aborted test data and reason for the aborted test.

(ix) The applicable quarterly report shall include the date of the end of the engine manufacturer's model year production for an engine family.

(x) The required information for all engine families in production during the quarter regardless of sample size.

(xi) The start and stop dates of batch-produced engine family production.

(C) Each engine manufacturer shall submit a copy of the report that has been stored (e.g., computer disc), or may be transmitted, in an electronically digitized manner, and in a format that is specified by the Executive Officer. This electronically based submission is in addition to the written submission of the report.

(c) 2001 and Later Model Year Cumulative Sum Production-Line Test Procedures

(1) Engine Sample Selection

(A) At the start of each model year, the engine manufacturer will begin to randomly select engines from each engine family with California sales greater than 20 units for production line testing, according to the criteria specified herein.

(i) For newly certified engine families: After two (2) engines are tested, the engine manufacturer will calculate the required sample size for the model year according to the Sample Size Equation in paragraph (c)(1)(B) of this section.

(ii) For carry-over engine families: After one engine is tested, the engine manufacturer must combine the test with the last test result from the previous model year and then calculate the required sample size for the model year according to the Sample Size Equation in paragraph (B) of this section.

(iii) The engines must be representative of the engine manufacturer's California sales. Each engine will be selected from the end of the assembly line. All engine models within the engine family must be included in the sample pool. Each selected engine for quality-audit testing must pass the inspection test, by being equipped with the appropriate emission control systems certified by the ARB. The procedure for randomly selecting engines or units of equipment must be submitted to the Chief, Mobile Source Operations Division, P.O. Box 8001, 9528 Telstar Avenue, El Monte, CA, 91734-8001, before the start of production for the first year of production.

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(iv)(a) Prior to the beginning of the 2001 model year, if an engine manufacturer cannot provide actual California sales data, it must provide its total production and an estimate of California sales at the end of the model year. The engine manufacturer must also provide supporting material for its estimate.

(b) For the 2001 and later model years, engine manufacturers must provide actual California sales, or other information acceptable to the Executive Officer, including, but not limited to, an estimate based on market analysis and federal production or sales.

(B)(i) Engine manufacturers must calculate the required sample size for the model year for each engine family using the Sample Size Equation below. N is calculated from each test result. The number N indicates the number of tests required for the model year for an engine family. N is recalculated after each test. Test results used to calculate the variables in the Sample Size Equation must be final deteriorated test results as specified in paragraph (c)(3)(C).

$$N = \left\lceil \frac{(t_{95} * \sigma)^2}{(x - FEL_{jx})^2} + 1 \right\rceil$$

where:

N = required sample size for the model year.

t₉₅ = 95% confidence coefficient. It is dependent on the actual number of tests completed, n, as specified in the table in paragraph (c)(1)(B)(ii) of this section. It defines one-tail, 95% confidence intervals.

FEL_{jx} = Family Emission Limit

s = actual test sample standard deviation calculated from the following equation:

$$\sigma = \sqrt{\frac{\sum (X_i - x)^2}{n - 1}}$$

where:

X_i = emission test result for an individual engine

x = mean of emission test results of the actual sample

n = The actual number of tests completed in an engine family

(ii) Actual Number of Tests (n) and 1-tail Confidence Coefficients (t₉₅) are listed in Table 3 below:

Table 3

Actual Number of Tests (n) and 1-tail Confidence Coefficients (t₉₅)

n	t ₉₅	n	t ₉₅	n	t ₉₅
2	6.31	12	1.80	22	1.72
3	2.92	13	1.78	23	1.72
4	2.35	14	1.77	24	1.71
5	2.13	15	1.76	25	1.71
6	2.02	16	1.75	26	1.71
7	1.94	17	1.75	27	1.71
8	1.90	18	1.74	28	1.70
9	1.86	19	1.73	29	1.70
10	1.83	20	1.73	30	1.70
11	1.81	21	1.72	∞	1.645

(iii) An engine manufacturer must distribute the testing of the remaining number of engines needed to meet the required sample size N, evenly throughout the remainder of the model year.

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(iv) After each new test, the required sample size, N, is recalculated using updated sample means, sample standard deviations and the appropriate 95% confidence coefficient.

(v) An engine manufacturer must continue testing and updating each engine family's sample size calculations according to paragraphs (c)(1)(B)(i) through (c)(1)(B)(iv) of this section until a decision is made to stop testing as described in paragraph (c)(1)(B)(vi) of this section or a noncompliance decision is made pursuant to paragraph (c)(2)(A)(v) of this section.

(vi) If, at any time throughout the model year, the calculated required sample size, N, for an engine family is less than or equal to the actual sample size, n, and the sample mean, x, for each regulated pollutant is less than or equal to the FEL for that pollutant, the engine manufacturer may stop testing that engine family except as required by paragraph (c)(2)(A)(vi).

(vii) If, at any time throughout the model year, the sample mean, x, for any regulated pollutant is greater than the FEL, the engine manufacturer must continue testing that engine family at the appropriate maximum sampling rate.

(viii) The maximum required sample size for an engine family (regardless of the required sample size, N, as calculated in paragraph (c)(1)(B)(i) of this section) is thirty (30) tests per model year.

(ix) Engine manufacturers may elect to test additional randomly chosen engines. All additional randomly chosen engines tested in accordance with the testing procedures specified in the Test Procedures must be included in the Sample Size and Cumulative Sum equation calculations as defined in paragraphs (c)(1)(B)(i) and (c)(2)(A)(i) of this section, respectively.

(C) The engine manufacturer must produce and assemble the test engines using its normal production and assembly process for engines to be distributed into commerce.

(D) No quality control, testing, or assembly procedures may be used on any test engine or any portion thereof, including parts and subassemblies, that have not been or will not be used during the production and assembly of all other engines of that family, unless the Executive Officer approves the modification.

(2) Calculation of the Cumulative Sum Statistic

(A) Each engine manufacturer must review the test results obtained in paragraph (c)(1) using the following procedure:

(i) Engine manufacturers must construct the following Cumulative Sum Equation for each regulated pollutant for each engine family. Test results used to calculate the variables in the Cumulative Sum Equation must be final deteriorated test results as defined in paragraph (c)(3)(C).

$$C_i = \max[0 \text{ or } (C_{i-1} + X_i - (\text{FEL}_{jx} = F))]$$

where:

- C_i = The current Cumulative Sum statistic
- C_{i-1} = The previous Cumulative Sum statistic. Prior to any testing, the Cumulative Sum statistic = 0 (i.e. $C_0 = 0$)
- X_i = The current emission test result for an individual engine
- FEL_{jx} = Family Emission Limit
- F = $0.25 \times \sigma$

After each test, C_i is compared to the action limit, H, the quantity that the Cumulative Sum statistic must exceed, in two (2) consecutive tests, before the engine family may be determined to be in noncompliance for purposes of paragraphs (a)(2)(A)(iv) and (a)(2)(A)(v).

H = The Action Limit. It is $5.0 \times s$, and is a function of the standard deviation, s.

σ = is the sample standard deviation and is recalculated after each test.

(ii) After each engine is tested, the Cumulative Sum statistic must be promptly updated according to the Cumulative Sum Equation in paragraph (c)(2)(A)(i) of this section.

(iii) If, at any time during the model year, an engine manufacturer amends the application for certification for an engine family as specified in Part I, section 28 or 29 of the Test Procedures by performing an engine family

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modification (i.e., a change such as a running change involving a physical modification to an engine, a change in specification or setting, the addition of a new configuration, or the use of a different deterioration factor), all previous sample size and Cumulative Sum statistic calculations for the model year will remain unchanged.

(iv) A failed engine is one whose final deteriorated test results pursuant to paragraph (c)(3)(C), for a regulated pollutant exceeds the FEL for that pollutant.

(v) An engine family may be determined to be in noncompliance, if at any time throughout the model year, the Cumulative Sum statistic, C_i , for, a regulated pollutant is greater than the action limit, H , for two (2) consecutive tests.

(vi) The engine manufacturer must perform a minimum of two tests per engine family per quarter, regardless of whether the conditions of paragraph (c)(1)(B)(vi) have been met. The Executive Officer may waive the requirement of this paragraph if the engine manufacturer does not have a failing engine family in the prior two model years of testing.

(vii) All results from previous quarters of the same model year must be included in the on-going Cumulative Sum analysis, provided that the engine family has not failed (e.g., if three engines of a family were tested in the first quarter, the first test of the second quarter would be considered as the fourth test).

(viii) If the Cumulative Sum analysis indicates that an engine family has failed, the engine manufacturer must notify the Chief of the Mobile Source Operations Division, in writing and by telephone, within ten working days. Corrective action will be taken as noted in paragraph (c)(4)(E).

(ix) If an engine manufacturer performs corrective action on a failed engine family and then resumes production, all previous tests will be void, and Cumulative Sum analysis will begin again with the next test.

(B) Within 45 days after the end of the quarter, or when the Cumulative Sum analysis indicates that a decision has been made, the engine manufacturer must provide all the data accumulated during the quarter.

(3) Calculation and Reporting of Test Results.

(A) Initial test results are calculated following the applicable test procedure specified in the Test Procedures.

(B) Final test results are calculated by summing the initial test results derived in paragraph (A) for each test engine and dividing by the number of tests conducted on the engine.

(C) The final deteriorated test results for each test engine are calculated by applying the appropriate deterioration factors, derived in the certification process for the engine family, to the final test results, and rounding in accordance with ASTM E29-93a, incorporated by reference herein, to the same number of decimal places contained in the applicable standard expressed to one additional significant figure.

(D) If, at any time during the model year, the Cumulative Sum statistic exceeds the applicable action limit, H , in two (2) consecutive tests, the engine family may be determined to be in noncompliance and the engine manufacturer must notify the Chief of the Mobile Source Operations Division and the Manager of the New Vehicle Audit Section, P.O. Box 8001, 9528 Telstar Avenue, El Monte, CA, 91734-8001, within ten working days of such exceedance by the Cumulative Sum statistic.

(E) Within 45 calendar days of the end of each quarter, each engine manufacturer must submit to the Executive Officer a report that includes the following information:

(i) The location and description of the engine manufacturer's or other's exhaust emission test facilities that were utilized to conduct testing reported pursuant to this section;

(ii) Total production and sample sizes, N and n , for each engine family.

(iii) The applicable emissions standards for each engine family.

(iv) A description of the process to obtain engines on a random basis;

(v) A description of the test engines or equipment (i.e., date of test, engine family, engine size, engine or equipment identification number, fuel system, dynamometer power absorber setting in horsepower or kilowatts, engine code or calibration number, and test location);

(vi) The date of the end of the engine manufacturer's model year production for each engine family;

(vii) For each test conducted,

(a) A description of the test engine, including:

(1) Configuration and engine family identification,

(2) Year, make, and build date,

(3) Engine identification number and explanation of the identification code, and

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- (4) Number of hours of service accumulated on engine prior to testing;
- (b) Location where service accumulation was conducted and description of accumulation procedure and schedule;
- (c) Test number, date, test procedure used, initial test results before and after rounding, and final test results for all exhaust emission tests, whether valid or invalid, and the reason for invalidation, if applicable;
- (d) The exhaust emission data for CO, NO_x and HC for each test engine or watercraft. The data reported must provide two (2) significant figures beyond the number of significant figures in the applicable emission standard.
- (e) The retest emissions data, as described in paragraph (a)(4) for any engine or watercraft failing the initial test, and description of the corrective measures taken, including specific components replaced or adjusted.
- (f) A complete description of any adjustment, modification, repair, preparation, maintenance, and/or testing that was performed on the test engine, was not reported pursuant to any other part of this article, and will not be performed on all other production engines;
- (g) A Cumulative Sum analysis, as required in paragraph (a)(2), of the production line test results for each engine family;
- (h) Any other information the Executive Officer may request relevant to the determination whether the new engines being manufactured by the engine manufacturer do in fact conform with the regulations with respect to which the Executive Order was issued;
- (viii) For each failed engine as defined in paragraph (vii)(d), above, a description of the remedy and test results for all retests;
- (ix) Every aborted test data and reason for the aborted test.
- (x) The start and stop dates of batch-produced engine family production;
- (xi) The required information for all engine families in production during the quarter regardless of sample size; and
- (F) Each engine manufacturer must submit a copy of the report that has been stored (e.g., computer disc), or may be transmitted, in an electronically digitized manner, and in a format that is specified by the Executive Officer. This electronically based submission is in addition to the written submission of the report.
- (d) Test Procedures Applicable to All Production Line Testing
 - (1) Standards and Test Procedures. The emission standards are those specified in Section 2442. The exhaust sampling and analytical procedures are those described in the Test Procedures. An engine is in compliance with the production line standards and test procedures only when all portions of the production line test procedures and requirements specified in Part IV of the Test Procedures are fulfilled, except that any adjustable engine parameters must be set to any value or position that is within the range available to the ultimate purchaser.
 - (2) Air Resources Board (ARB) personnel and mobile laboratories must have access to engine or equipment assembly plants, distribution facilities, and test facilities for the purpose of engine selection, testing, and observation. Scheduling of access must be arranged with the designated engine manufacturer's representative and must not unreasonably disturb normal operations (See section 31 of the Test Procedures).
 - (3) Engine Preparation and Preconditioning
 - (A) No emissions tests may be performed on an engine before the first production line test on that engine.
 - (B) The engine or watercraft must be tested after the engine manufacturer's recommended break-in period. The engine manufacturer must submit to the Executive Officer the schedule for engine break-in and any changes to the schedule with each quarterly report. This schedule must be adhered to for all production line testing within an engine family and subgroup or engine family and assembly plant as appropriate.
 - (C) If an engine or watercraft is shipped to a remote facility for production line testing, and adjustment or repair is necessary because of such shipment, the engine manufacturer must perform the necessary adjustments or repairs only after the initial test of the engine or watercraft. Engine manufacturers must report to the Executive Officer in the quarterly report, all adjustments or repairs performed on engines or watercraft prior to each test. In the event a retest is performed, a request may be made to the Executive Officer, within ten days of the production quarter, for permission to substitute the after-repair test results for the original test results. The Executive Officer will either affirm or deny the request by the engine manufacturer within ten working days from receipt of the request.

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(D) If an engine manufacturer determines that the emission test results of an engine or watercraft are invalid, the engine or equipment must be retested. Emission results from all tests must be reported. The engine manufacturer must include a detailed report on the reasons for each invalidated test in the quarterly report.

(4) Manufacturer Notification of Failure

(A) The Executive Officer will notify the engine manufacturer that the engine manufacturer may be subject to revocation or suspension of the Executive Order authorizing sales and distribution of the noncompliant engines in the State of California of the noncompliant engines in the State of California pursuant to section 43017 of the Health and Safety Code. Prior to revoking or suspending the Executive Order, or seeking to enjoin an engine manufacturer, the Executive Officer will consider all information provided by the engine manufacturer, and other interested parties, including, but not limited to corrective actions applied to the noncompliant engine family.

(B) The Executive Officer will notify the equipment manufacturer that the equipment manufacturer may be subject to revocation or suspension of the Executive Order or penalized pursuant to section 43017 of the Health and Safety Code. Prior to revoking or suspending the Executive Order, or penalizing an equipment manufacturer, the Executive Officer will consider all information provided by interested parties, including, but not limited to corrective actions applied to the noncompliant engine family.

(5) Suspension and Revocation of Executive Orders.

(A) The Executive Order is automatically suspended with respect to any engine failing pursuant to paragraph (b)(3)(D) or (c)(2)(A)(iv) effective from the time that testing of that engine is completed.

(B) The Executive Officer may suspend the Executive Order for an engine family that is determined to be in noncompliance pursuant to paragraph (b)(3)(C) or (c)(2)(A)(v). This suspension will not occur before fifteen (15) days after the engine family is determined to be in noncompliance.

(C) If the results of testing pursuant to these regulations indicate that engines of a particular family produced at one plant of an engine manufacturer do not conform to the regulations with respect to which the Executive Order was issued, the Executive Officer may suspend the Executive Order with respect to that family for engines manufactured by the engine manufacturer at all other plants.

(D) Notwithstanding the fact that engines described in the application for certification may be covered by an Executive Order, the Executive Officer may suspend such Executive Order immediately in whole or in part if the Executive Officer finds any one of the following infractions to be substantial:

(i) The engine manufacturer refuses to comply with any of the requirements of this section.

(ii) The engine manufacturer submits false or incomplete information in any report or information provided to the Executive Officer under this section.

(iii) The engine manufacturer renders inaccurate any test data submitted under this section.

(iv) An ARB enforcement officer is denied the opportunity to conduct activities authorized in this section.

(v) An ARB enforcement officer is unable to conduct activities authorized in paragraph (d)(2) of this section because an engine manufacturer has located its facility in a foreign jurisdiction where local law prohibits those activities.

(E) The Executive Officer will notify the engine manufacturer in writing of any suspension or revocation of an Executive Order in whole or in part. A suspension or revocation is effective upon receipt of the notification or fifteen (15) days from the time an engine family is determined to be in noncompliance pursuant to paragraph (d)(1), except that the Executive Order is immediately suspended with respect to any failed engines as provided for in paragraph (b)(3)(D) or (c)(2)(iv) of this section.

(F) The Executive Officer may revoke an Executive Order for an engine family after the Executive Order has been suspended pursuant to paragraph (d)(5)(B) or (C) of this section if the proposed remedy for the nonconformity, as reported by the engine manufacturer to the Executive Officer, is one requiring a design change or changes to the engine and/or emission control system as described in the application for certification of the affected engine family.

(G) Once an Executive Order has been suspended for a failed engine, as provided for in paragraph (d)(5)(A) of this section, the engine manufacturer must take the following actions before the Executive Order is reinstated for that failed engine:

(i) Remedy the nonconformity;

(ii) Demonstrate that the engine conforms to its applicable FEL by retesting the engine in accordance with these regulations; and

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(iii) Submit a written report to the Executive Officer, after successful completion of testing on the failed engine, that contains a description of the remedy and test results for each engine in addition to other information that may be required by this part.

(H) Once an Executive Order for a failed engine family has been suspended pursuant to paragraphs (d)(5)(B), (C) or (D) of this section, the engine manufacturer must take the following actions before the Executive Officer will consider reinstating the Executive Order:

(i) Submit a written report to the Executive Officer that identifies the reason for the noncompliance of the engines, describes the proposed remedy, including a description of any proposed quality control and/or quality assurance measures to be taken by the engine manufacturer to prevent future occurrences of the problem, and states the date on which the remedies will be implemented.

(ii) Demonstrate that the engine family for which the Executive Order has been suspended does in fact comply with the regulations of paragraphs (b) or (c), as applicable, by testing as many engines as needed so that the Cumulative Sum statistic, as calculated in paragraph (c)(2)(A)(i), falls below the action limit, or the average emissions from the Quality-Audit testing as calculated in paragraph (b)(3)(A) remains below the FEL, as applicable. Such testing must comply with the provisions of paragraphs (b) or (c), as applicable. If the engine manufacturer elects to continue testing individual engines after suspension of an Executive Order, the Executive Order is reinstated for any engine actually determined to be in conformance with the emission standards through testing in accordance with the applicable test procedures, provided that the Executive Officer has not revoked the Executive Order pursuant to paragraph (d)(5)(F) of this section.

(I) Once the Executive Order has been revoked for an engine family, if the engine manufacturer wants to introduce into commerce a modified version of that family, the following actions must be taken before the Executive Officer may issue an Executive Order for that modified family:

(i) If the Executive Officer determines that the proposed change(s) in engine design may have an effect on emission performance deterioration, the Executive Officer will notify the engine manufacturer, within five (5) working days after receipt of the report in paragraph (d)(5)(H)(i) of this section, whether subsequent testing under this section will be sufficient to evaluate the proposed change or changes or whether additional testing will be required; and

(ii) After implementing the change or changes intended to remedy the nonconformity, the engine manufacturer must demonstrate that the modified engine family does in fact conform with the regulations of paragraphs (b) or (c), as applicable, by testing as many engines as needed from the modified engine family so that the Cumulative Sum statistic, as calculated in paragraph (c)(2)(A)(i), falls below the action limit, or the average emissions from the Quality-Audit testing as calculated in paragraph (b)(3)(A) remains below the FEL, as applicable. When this requirement is met, the Executive Officer will reissue the Executive Order or issue a new Executive Order, as the case may be, to include that family. The revocation of engine family executive orders issued based on Cumulative Sum testing results remains in effect as long as the Cumulative Sum statistic remains above the action limit.

(J) At any time after the suspension of an Executive Order for a test engine under to paragraph (d)(5)(A) of this section, but not later than fifteen (15) days (or such longer period as may be allowed by the Executive Officer) after notification of the Executive Officer's decision to suspend or revoke an Executive Order in whole or in part pursuant to paragraphs (d)(5)(B), (C) or (F) of this section, an engine manufacturer may request a hearing pursuant to subchapter 1.25, Title 17, California Code of Regulations, as to whether the tests have been properly conducted or any sampling methods have been properly applied.

(K) Any suspension of an Executive Order under paragraph (d)(5)(D) of this section:

(i) must be made only after the engine manufacturer concerned has been offered an opportunity for a hearing pursuant to subchapter 1.25, Title 17, California Code of Regulations, and;

(ii) does not apply to engines no longer in the possession of the engine manufacturer.

(L) After the Executive Officer suspends or revokes an Executive Order pursuant to this section and before the commencement of a hearing, if the engine manufacturer demonstrates to the Executive Officer's satisfaction that the decision to suspend or revoke the Executive Order was based on erroneous information, the Executive Officer will reinstate the Executive Order.

(M) To permit an engine manufacturer to avoid storing non-test engines while conducting subsequent testing of the noncomplying family, an engine manufacturer may request that the Executive Officer conditionally reinstate the

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Executive Order for that family. The Executive Officer may reinstate the Executive Order subject to the following condition: the engine manufacturer must commit to recall all engines of that family produced from the time the Executive Order is conditionally reinstated, and must commit to remedy any nonconformity at no expense to the owner.

(e) Selective Enforcement Auditing Regulations

(1) Test orders.

(A) A test order addressed to the engine manufacturer is required for any testing under paragraph (e).

(B) The test order is signed by the Executive Officer or his or her designee. The test order must be delivered in person by an ARB enforcement officer or ARB authorized representative to a company representative or sent by registered mail, return receipt requested, to the engine manufacturer's representative who signed the application for certification submitted by the engine manufacturer, pursuant to the requirements of the applicable portions of Title 13, California Code of Regulations, section 2447. Upon receipt of a test order, the engine manufacturer must comply with all of the provisions of this subsection and instructions in the test order.

(C) Information included in test order.

(i) The test order will specify the engine family to be selected for testing, the engine manufacturer's engine assembly plant or associated storage facility or port facility (for imported engines) from which the engines must be selected, the time and location at which engines must be selected, and the procedure by which engines of the specified family must be selected. The test order may specify the configuration to be audited and/or the number of engines to be selected per day. Engine manufacturers are required to select a minimum of four engines per day unless an alternate selection procedure is approved pursuant to paragraph (e)(2)(A), or unless total production of the specified configuration is less than four engines per day. If total production of the specified configuration is less than four engines per day, the engine manufacturer selects the actual number of engines produced per day.

(ii) The test order may include alternate families to be selected for testing at the Executive Officer's discretion in the event that engines of the specified family are not available for testing because those engines are not being manufactured during the specified time or are not being stored at the specified assembly plant, associated storage facilities, or port of entry.

(iii) If the specified family is not being manufactured at a rate of at least two (2) engines per day in the case of engine manufacturers specified in paragraph (e)(4)(G)(i) of this section, or one engine per day in the case of engine manufacturers specified in paragraph (e)(4)(G)(ii) of this section, over the expected duration of the audit, the Executive Officer or her or his designated representative may select engines of the alternate family for testing.

(iv) In addition, the test order may include other directions or information essential to the administration of the required testing.

(D) An engine manufacturer may submit a list of engine families and the corresponding assembly plants, associated storage facilities, or (in the case of imported engines) port facilities from which the engine manufacturer prefers to have engines selected for testing in response to a test order. In order that an engine manufacturer's preferred location be considered for inclusion in a test order for a particular engine family, the list must be submitted prior to issuance of the test order. Notwithstanding the fact that an engine manufacturer has submitted the list, the Executive Officer may order selection at other than a preferred location.

(E) Upon receipt of a test order, an engine manufacturer must proceed in accordance with the provisions of paragraph (e).

(2) Testing by the Executive Officer.

(A) The Executive Officer may require by test order under paragraph (e)(1) that engines of a specified family be selected in a manner consistent with the requirements of paragraph (e)(3) and submitted to the Executive Officer at the place designated for the purpose of conducting emission tests. These tests will be conducted in accordance with paragraph (e)(4) to determine whether engines manufactured by the engine manufacturer conform with the regulations with respect to which the certificate of conformity was issued.

(B) Designating official data.

(i) Whenever the Executive Officer conducts a test on a test engine or the Executive Officer and engine manufacturer each conduct a test on the same test engine, the results of the Executive Officer's test are the official data for that engine.

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(ii) Whenever the engine manufacturer conducts all tests on a test engine, the engine manufacturer's test data are accepted as the official data, provided that if the Executive Officer makes a determination based on testing conducted under paragraph (e)(2)(A) of this section that there is a substantial lack of agreement between the engine manufacturer's test results and the Executive Officer's test results, no engine manufacturer's test data from the engine manufacturer's test facility will be accepted for purposes of this subsection.

(C) If testing conducted under paragraph (e)(1) is unacceptable under paragraph (B)(ii) of this subsection, the Executive Officer must:

(i) Notify the engine manufacturer in writing of the Executive Officer's determination that the test facility is inappropriate for conducting the tests required by this subsection and the reasons therefor; and

(ii) Reinstate any engine manufacturer's data upon a showing by the engine manufacturer that the data acquired under paragraph (e)(2) were erroneous and the engine manufacturer's data was correct.

(D) The engine manufacturer may request in writing that the Executive Officer reconsider the determination in paragraph (B)(ii) of this section based on data or information indicating that changes have been made to the test facility and these changes have resolved the reasons for disqualification.

(3) Sample selection.

(A) Engines comprising a test sample will be selected at the location and in the manner specified in the test order. If an engine manufacturer determines that the test engines cannot be selected in the manner specified in the test order, an alternative selection procedure may be employed, provided the engine manufacturer requests approval of the alternative procedure before starting test sample selection, and the Executive Officer approves the procedure.

(B) The engine manufacturer must produce and assemble the test engines of the family selected for testing using its normal production and assembly process for engines to be distributed into commerce. If, between the time the engine manufacturer is notified of a test order and the time the engine manufacturer finishes selecting test engines, the engine manufacturer implements any change(s) in its production or assembly processes, including quality control, which may reasonably be expected to affect the emissions of the engines selected, then the engine manufacturer must, during the audit, inform the Executive Officer of such changes. If the test engines are selected at a location where they do not have their operational and emission control systems installed, the test order will specify the manner and location for selection of components to complete assembly of the engines. The engine manufacturer must assemble these components onto the test engines using normal assembly and quality control procedures as documented by the engine manufacturer.

(C) No quality control, testing, or assembly procedures will be used on the test engine or any portion thereof, including parts and subassemblies, that have not been or will not be used during the production and assembly of all other engines of that family, unless the Executive Officer approves the modification in production or assembly procedures pursuant to paragraph (B) of this subsection.

(D) The test order may specify that an ARB enforcement officer(s) or authorized representative(s), rather than the engine manufacturer, select the test engines according to the method specified in the test order.

(E) The order in which test engines are selected determines the order in which test results are to be used in applying the sampling plan in accordance with paragraph (e)(5).

(F) The engine manufacturer must keep on hand all untested engines, if any, comprising the test sample until a pass or fail decision is reached in accordance with paragraph (e)(5)(E). The engine manufacturer may ship any tested engine which has not failed the requirements as set forth in paragraph (e)(5)(B). However, once the engine manufacturer ships any test engine, it may not conduct retests as provided in paragraph (e)(4)(I).

(4) Test procedures.

(A)(i) For spark-ignition marine engines subject to the provisions of this subsection, the prescribed test procedures are the test procedures as specified in Part IV of the Test Procedures.

(ii) The Executive Officer may, on the basis of a written application by an engine manufacturer, prescribe test procedures other than those specified in paragraph (i) for any spark-ignition marine engine he or she determines is not susceptible to satisfactory testing using the procedures specified in paragraph (i).

(B)(i) The engine manufacturer may not adjust, repair, prepare, or modify the engines selected for testing and may not perform any emission tests on engines selected for testing pursuant to the test order unless this adjustment, repair, preparation, modification, and/or tests are documented in the engine manufacturer's engine assembly and

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inspection procedures and are actually performed or unless these adjustments and/ or tests are required or permitted under this subsection or are approved in advance by the Executive Officer.

(ii) The Executive Officer may adjust or cause to be adjusted any engine parameter that the Executive Officer determines subject to adjustment for certification and Selective Enforcement Audit testing in accordance with Part I, section 18 of the Test Procedures, adopted October 21, 1999 and incorporated by reference herein, to any setting within the physically adjustable range of that parameter, as determined by the Executive Officer in accordance with section 18, prior to the performance of any tests. However, if the idle speed parameter is one which the Executive Officer has determined to be subject to adjustment, the Executive Officer may not adjust it to any setting that causes a lower engine idle speed than would have been possible within the physically adjustable range of the idle speed parameter if the engine manufacturer had accumulated 12 hours of service on the engine under paragraph (C) of this section, all other parameters being identically adjusted for the purpose of the comparison. The engine manufacturer may be requested to supply information needed to establish an alternate minimum idle speed. The Executive Officer, making or specifying these adjustments, may consider the effect of the deviation from the engine manufacturer's recommended setting on emission performance characteristics as well as the likelihood that similar settings will occur on in-use engines. In determining likelihood, the Executive Officer may consider factors such as, but not limited to, the effect of the adjustment on engine performance characteristics and information from similar in-use engines.

(C) Service Accumulation. Before performing exhaust emission testing on a selective enforcement audit test engine, the engine manufacturer may accumulate on each engine a number of hours of service equal to the greater of 12 hours or the number of hours the engine manufacturer accumulated during certification on the emission data engine corresponding to the family specified in the test order.

(i) Service accumulation must be performed in a manner using good engineering judgment to obtain emission results representative of normal production engines. This service accumulation must be consistent with the new engine break-in instructions contained in the applicable owner's manual.

(ii) The engine manufacturer must accumulate service at a minimum rate of 6 hours per engine during each 24-hour period, unless otherwise approved by the Executive Officer.

(a) The first 24-hour period for service begins as soon as authorized checks, inspections, and preparations are completed on each engine.

(b) The minimum service accumulation rate does not apply on weekends or holidays.

(c) If the engine manufacturer's service or target is less than the minimum rate specified (6 hours per day), then the minimum daily accumulation rate is equal to the engine manufacturer's service target.

(iii) Service accumulation must be completed on a sufficient number of test engines during consecutive 24-hour periods to assure that the number of engines tested per day fulfills the requirements of paragraphs (G)(i) and (G)(ii) of this section.

(D) The engine manufacturer may not perform any maintenance on test engines after selection for testing, nor may the Executive Officer allow deletion of any engine from the test sequence, unless requested by the engine manufacturer and approved by the Executive Officer before any engine maintenance or deletion.

(E) The engine manufacturer must expeditiously ship test engines from the point of selection to the test facility. If the test facility is not located at or in close proximity to the point of selection, the engine manufacturer must assure that test engines arrive at the test facility within 24 hours of selection. The Executive Officer may approve more time for shipment based upon a request by the engine manufacturer accompanied by a satisfactory justification.

(F) If an engine cannot complete the service accumulation or an emission test because of a malfunction, the engine manufacturer may request that the Executive Officer authorize either the repair of that engine or its deletion from the test sequence.

(G) Whenever an engine manufacturer conducts testing pursuant to a test order issued under this subsection, the engine manufacturer must notify the Executive Officer within one working day of receipt of the test order as to which test facility will be used to comply with the test order. If no test cells are available at a desired facility, the engine manufacturer must provide alternate testing capability satisfactory to the Executive Officer.

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(i) An engine manufacturer with projected spark-ignition marine engine sales for the California market for the applicable year of 20 or greater must complete emission testing at a minimum rate of two (2) engines per 24-hour period, including each voided test.

(ii) An engine manufacturer with projected spark-ignition marine engine sales for the California market for the applicable year of less than 20 must complete emission testing at a minimum rate of one engine per 24-hour period, including each voided test.

(iii) The Executive Officer may approve a lower daily rate of emission testing based upon a request by an engine manufacturer accompanied by a satisfactory justification.

(H) The engine manufacturer must perform test engine selection, shipping, preparation, service accumulation, and testing in such a manner as to assure that the audit is performed in an expeditious manner.

(I) Retesting.

(i) The engine manufacturer may retest any engines tested during a Selective Enforcement Audit once a fail decision for the audit has been reached in accordance with paragraph (e)(5)(E).

(ii) The Executive Officer may approve retesting at other times based upon a request by the engine manufacturer accompanied by a satisfactory justification.

(iii) The engine manufacturer may retest each engine a total of three times. The engine manufacturer must test each engine or vehicle the same number of times. The engine manufacturer may accumulate additional service before conducting a retest, subject to the provisions of paragraph (C) of this paragraph (4).

(J) An engine manufacturer must test engines with the test procedure specified in Part IV of the Test Procedures to demonstrate compliance with the exhaust emission standard (or applicable FEL) for HC+NO_x. If alternate procedures were used in certification pursuant to Part 1, section 20(c) of the Test Procedures, adopted October 21, 1999 and incorporated by reference herein, then those alternate procedures must be used.

(5) Compliance with acceptable quality level and passing and failing criteria for selective enforcement audits.

(A) The prescribed acceptable quality level is 40 percent.

(B) A failed engine is one whose final test results for HC+NO_x pursuant to paragraph (b)(3)(D) or (c)(2)(iv), as applicable, exceed the applicable family emission level.

(C) The engine manufacturer must test engines comprising the test sample until a pass or fail decision is reached for HC+NO_x. A pass decision is reached when the cumulative number of failed engines, as defined in paragraph (B), for HC+NO_x is less than or equal to the pass decision number, as defined in paragraph (D), appropriate to the cumulative number of engines tested. A fail decision is reached when the cumulative number of failed engines for HC+NO_x is greater than or equal to the fail decision number, as defined in paragraph (D), appropriate to the cumulative number of engines tested.

(D) The pass and fail decision numbers associated with the cumulative number of engines tested are determined by using the tables in Appendix A to this subsection (e), "Sampling Plans for Selective Enforcement Auditing of Spark-Ignition Marine Engines," appropriate to the projected sales as made by the engine manufacturer in its report to ARB under paragraph (b)(4) or (c)(3)(A). In the tables in Appendix A to this subsection, sampling plan A stage refers to the cumulative number of engines tested. Once a pass or fail decision has been made for HC+NO_x, the number of engines with final test results exceeding the emission standard for HC+NO_x shall not be considered any further for the purposes of the audit.

(E) Passing or failing a selective enforcement audit occurs when the decision is made on the last engine required to make a decision under paragraph (C).

(F) The Executive Officer may terminate testing earlier than required in paragraph (C) upon either a manufacturer's or Executive Officer's admission that further testing would not change the pass/fail decision.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code. Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

REFERENCE

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Appendix to Paragraph (e) of Section 2446--Sampling Plans for Selective Enforcement Auditing of Spark-Ignition Marine Engines

Table 1.--Sampling Plan Code Letter

<i>Annual engine family sales (in California)</i>	<i>Code letter</i>
20-50	AA. ¹
20-99	A.
100-299	B.
300-499	C.
500 or greater	D.

¹An engine manufacturer may use either the sampling plan for code letter "AA" or sampling plan for code letter "A" for Selective Enforcement Audits of engine families with annual sales between 20 and 50 engines. Additionally, the engine manufacturer may switch between these plans during the audit.

Table 2.--Sampling Plan for Code Letter "AA"

[Sample inspection criteria]

<i>Stage</i>	<i>Pass No.</i>	<i>Fail No.</i>	<i>Stage</i>	<i>Pass No.</i>	<i>Fail No.</i>
1	(¹)	(²)	11	4	8
2	(¹)	(²)	12	4	9
3	0	(²)	13	5	9
4	0	(²)	14	5	10
5	1	5	15	6	10
6	1	6	16	6	10
7	2	6	17	7	10
8	2	7	18	8	10
9	3	7	19	8	10
10	3	8	20	9	10

¹ Test sample passing not permitted at this stage.

² Test sample failure not permitted at this stage.

Table 3.--Sampling Plan for Code Letter "A"

[Sample inspection criteria]

<i>Stage</i>	<i>Pass No.</i>	<i>Fail No.</i>	<i>Stage</i>	<i>Pass No.</i>	<i>Fail No.</i>
1	(¹)	(²)	16	6	11
2	(¹)	(²)	17	7	12
3	(¹)	(²)	18	7	12
4	0	(²)	19	8	13
5	0	(²)	20	8	13
6	1	6	21	9	14
7	1	7	22	10	14
8	2	7	23	10	15
9	2	8	24	11	15
10	3	8	25	11	16
11	3	8	26	12	16
12	4	9	27	12	17
13	5	10	28	13	17
14	5	10	29	14	17
15	6	11	30	16	17

¹ Test sample passing not permitted at this stage.

² Test sample failure not permitted at this stage.

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Table 4.--Sampling Plan for Code Letter “B”

[Sample inspection criteria]

<i>Stage</i>	<i>Pass No.</i>	<i>Fail No.</i>	<i>Stage</i>	<i>Pass No.</i>	<i>Fail No.</i>
1	(¹)	(²)	21	9	14
2	(¹)	(²)	22	9	15
3	(¹)	(²)	23	10	15
4	(¹)	(²)	24	10	16
5	0	(²)	25	11	16
6	0	6	26	11	17
7	1	7	27	12	17
8	2	7	28	12	18
9	2	8	29	13	18
10	3	9	30	13	19
11	3	9	31	14	19
12	4	10	32	14	20
13	4	10	33	15	20
14	5	11	34	16	21
15	5	11	35	16	21
16	6	12	36	17	22
17	6	12	37	17	22
18	7	13	38	18	22
19	7	13	39	18	22
20	8	14	40	21	22

¹ Test sample passing not permitted at this stage.

² Test sample failure not permitted at this stage.

Table 5.--Sampling Plan for Code Letter “C”

[Sample inspection criteria]

<i>Stage</i>	<i>Pass No.</i>	<i>Fail No.</i>	<i>Stage</i>	<i>Pass No.</i>	<i>Fail No.</i>
1	(¹)	(²)	26	11	17
2	(¹)	(²)	27	12	17
3	(¹)	(²)	28	12	18
4	(¹)	(²)	29	13	18
5	0	(²)	30	13	19
6	0	6	31	14	19
7	1	7	32	14	20
8	2	7	33	15	20
9	2	8	34	16	21
10	3	9	35	16	21
11	3	9	36	17	22
12	4	10	37	17	22
13	4	10	38	18	22
14	5	11	39	18	22
15	5	11	40	21	22
16	6	12	41	19	24
17	6	12	42	20	25
18	7	13	43	20	25
19	7	13	44	21	26
20	8	14	45	21	27
21	8	14	46	22	27
22	9	15	47	22	27
23	10	15	48	23	27
24	10	16	49	23	27
25	11	16	50	26	27

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¹ Test sample passing not permitted at this stage.

² Test sample failure not permitted at this stage.

Table 6.--Sampling Plan for Code Letter “D”

[Sample inspection criteria]

<i>Stage</i>	<i>Pass No.</i>	<i>Fail No.</i>	<i>Stage</i>	<i>Pass No.</i>	<i>Fail No.</i>
1	(¹)	(²)	31	14	19
2	(¹)	(²)	32	14	20
3	(¹)	(²)	33	15	20
4	(¹)	(²)	34	16	21
5	0	(²)	35	16	21
6	0	6	36	17	22
7	1	7	37	17	22
8	2	7	38	18	22
9	2	8	39	18	22
10	3	9	40	21	22
11	3	9	41	19	24
12	4	10	42	20	25
13	4	10	43	20	25
14	5	11	44	21	26
15	5	11	45	21	27
16	6	12	46	22	27
17	6	12	47	22	27
18	7	13	48	23	27
19	7	13	49	23	27
20	8	14	50	26	27
21	8	14	51	24	30
22	9	15	52	25	31
23	10	15	53	25	31
24	10	16	54	26	32
25	11	16	55	26	32
26	11	17	56	27	33
27	12	17	57	27	33
28	12	18	58	28	33
29	13	18	59	28	33
30	13	19	60	32	33

¹ Test sample passing not permitted at this stage.

² Test sample failure not permitted at this stage.